PATENT COOPERATION TREAT

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference JTS/CP/P13544PC	FOR FURTHER ACT	TION 5	See Form PCT/IPEA/416		
International application No. PCT/GB2004/002544	International filing date (da 14.06.2004	ay/month/year)	Priority date (day/month/year) 12.06.2003		
International Patent Classification (IPC) or na B01D33/03, B07B1/46	ational classification and IPC				
Applicant AXIOM PROCESS LIMITED et al.					
Authority under Article 35 and trai	nsmitted to the applicant	according to Article 36	International Preliminary Examining .		
2. This REPORT consists of a total of	2. This REPORT consists of a total of 5 sheets, including this cover sheet.				
	3. This report is also accompanied by ANNEXES, comprising:				
	a. Sent to the applicant and to the International Bureau) a total of 5 sheets, as follows:				
Sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).					
sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.					
b. (sent to the International E sequence listing and/or tal Box Relating to Sequence	bles related thereto, in co	mouter readable form	r of electronic carrier(s)) , containing a only, as indicated in the Supplemental instructions).		
This report contains indications relating to the following items:					
☐ Box No. I Basis of the op	inion				
☐ Box No. II Priority					
☐ Box No. III Non-establishn	ment of opinion with regar	d to novelty, inventive	step and industrial applicability		
☐ Box No. IV Lack of unity of					
applicability; ci	itations and explanations) with regard to novelty supporting such stater	, inventive step or industrial nent		
☐ Box No. Vi Certain docum					
	s in the international appl				
☐ Box No. VIII Certain observ	ations on the internationa	al application			
Date of submission of the demand		Date of completion of the	ls report		
11.01.2005		27.09.2005			
Name and mailing address of the Internation preliminary examining authority:	onal	Authorized Officer	Sentuciona Patacream.		
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. PCT/GB2004/002544

	Box No. I Basis of the report			
1.	ith regard to the language , this report is based on the international application in the language in which it was ed, unless otherwise indicated under this item.			
	which is the language of a tra international search (unde publication of the international preliminary e	onal application (under Rule 12.4) examination (under Rules 55.2 and/or 55.3)		
2.	With regard to the elements* of the international application, this report is based on (replacement sheets whith have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):			
	Description, Pages			
	1-13	as originally filed		
	Claims, Numbers	4.40.04.0005		
	1-18	received on 14.01.2005 with letter of 10.01.2005		
Drawings, Sheets				
	1/6-6/6	as originally filed		
	☐ a sequence listing and/or a	ny related table(s) - see Supplemental Box Relating to Sequence Listing		
3	The amendments have res ☐ the description, pages ☐ the claims, Nos. ☐ the drawings, sheets/fig ☐ the sequence listing (sp	s necify): nequence listing <i>(specify)</i> :		
	had not been made, since they Supplemental Box (Rule 70.2(c)) the description, pages the claims, Nos. the drawings, sheets/fig the sequence listing (s) any table(s) related to	gs <i>pecify)</i> : sequence listing <i>(specify)</i> :		
	* If item 4 applies,	some or all of these sheets may be marked "superseded."		

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. PCT/GB2004/002544

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-18

No: Claims

Inventive step (IS) Yes: Claims 1-18

No: Claims

Industrial applicability (IA) Yes: Claims 1-18

No: Claims

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

PCT/GB2004/002544

Re Items V. and VIII.

The following documents are referred to:

D1: US 6 530 482 B1 (WISEMAN MICHAEL D) 11 March 2003 (2003-03-11)

D2: US 4 446 022 A (HARRY ALAN) 1 May 1984 (1984-05-01)

D3: EP 1 088 582 A (TUBOSCOPE I P INC) 4 April 2001 (2001-04-04)

D4: DE 42 10 770 A (KAUFMANN FRIEDHELM) 7 October 1993 (1993-10-07)

- 2.1 Document D1 describes a basket 22 suitable for use in a vibratory screening apparatus 10 (shale shaker), for use in removing solids from a liquid and solids mixture feed, said basket mounting a stack of screen assemblies 14-18, with superposed screen assemblies 14,16;18,20 separated from each other by a respective flow directing tray 30 (flowback pan), and being provided with a flow distributor 36;26,28;32,34 formed and arranged for dividing the feed stream into a first feed stream and a second feed stream and directing said feed streams onto respective ones of first and second screen assemblies, and receiving filtrate from a respective screen assembly, from said respective flow directing tray (cf. column 3, line 15 column 4, line 17).
- 2.2 The subject-matter of amended claim 1 differs from said basket in that the stack comprises at least three screen assemblies and that the flow distributor is formed and arranged for receiving filtrate from a primary upper screen assembly and for dividing said filtrate into at least a first and second feed stream.
- 2.3 It is understood that the technical problem to be solved by the present application is to improve the efficiency of a vibratory screening apparatus and thus of the applied basket in relation to the physical size thereof (cf. page 1, lines 13-15).
- 2.4 D1 discloses a tandem shale shaker comprising upper and lower screens. The shaker, normally operated in series, should also be suitable to be operated in parallel. According to D1, a distribution apparatus is set to selectively direct unscreened liquid to the lower screen. Further, D1 mentions flow directors which selectively direct screened liquid from the upper screen to the lower screen or away from the lower screen to the sump (cf. column 3, lines 22-25). D1 refers to a need to enhance the

capacity of a tandem shale shaker during high volume operations without increasing the space required by the shaker (cf. column 1, lines 60-63). Thus, the technical problem to be solved by D1 is similar to the object of the present application. However, D1 teaches a different solution of the problem.

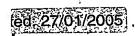
2.5 Document D2 discloses a vibratory screening apparatus having a basket 10 mounting a stack of screening assemblies 54,56,58 (cf. embodiment of Figures 3 and 4). In order to handle higher throughput volume, the trays include adjustable weirs as flow control devices of flow distributors. Liquid collection trays 68,70 act as flow directing trays.

D2 as well as documents D3 and D4 give no lead to the solution of the technical problem as claimed in new claim 1.

2.6 It is therefore concluded that the subject-matter of new claim 1 fulfils the requirements of Art.33(2) and 33(3) PCT. The same applies to the dependent claims.

3. Art.6 PCT

- 3.1 The embodiments of Figures 2A,2B,5A; 3A,3B,5B; 9 and 10 do not fall under the scope of new claim 1 (Art.6PCT). Further, new claim 4 is in contradiction to new claim 1, since claim 4 is directed to an operation in series (Art.6PCT)..
- 3.2 Dependent claim 2 refers to "a basket ... mounted in a said vibratory screening apparatus, ..., said apparatus comprising ...". Thus, dependent claim 2 should be directed to vibratory screening apparatus for ..., said apparatus comprising ... and a basket according to claim 1..., rather than a basket (Art.6 PCT: clarity).



CLAIMS

- 1. A basket (4) suitable for use in a vibratory screening apparatus (1), for use in removing solids from a liquid and solids mixture feed, said basket (4) mounting a stack of at least three screen assemblies (8', 8''', 8'''), with superposed screen assemblies separated from each other by a respective flow directing tray (9, 31, 37), and being provided with a flow distributor (15, 24) formed and arranged for receiving filtrate from a primary upper screen assembly (8') and dividing said filtrate into at least a first feed stream and a second feed stream and directing said feed streams onto respective ones of first and second screen assemblies (8'', 8'''), and receiving filtrate from a respective screen assembly (8', 8'''), from said respective flow directing tray(s).
 - A basket (4) according to claim 1, mounted in a said vibratory screening apparatus (1) for use in removing solids from a liquid and solids mixture feed, said apparatus
 comprising a static outer housing (2), said housing comprising: a base support (60) formed and arranged for mounting at least one said basket in floating manner so as to be vibratable, in use of the apparatus, by a vibrator device (10) formed and arranged for vibrating said basket (4), said
 base support (60) having a sump (56, 61) for receiving filtrate from said basket (4), and said housing (2) having a feed device (64) formed and arranged for directing said liquid and solids mixture feed to said basket (4) mounted in said base support (60).



3. A basket as claimed in claim 1 or claim 2 wherein said flow distributor (15) is formed and arranged so as to be switchable between a plurality of different flow directing

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configurations.

- 4. A basket as claimed in claim 3 wherein said plurality of flow directing configurations includes an intensive screening configuration in which the whole of the feed is directed onto said first screen assembly (8'', 36) and the whole of the filtrate from said first screen assembly (8'', 36) is directed onto said second screen assembly (8'', 46).
 - 5. A basket as claimed in claim 3 or claim 4 wherein said plurality of flow directing configurations includes a restricted feed capacity configuration in which the whole of the feed is directed onto only one of said first and second screen assemblies (8'', 36, 8''', 46), and the filtrate therefrom exhausted directly from the apparatus (1) without passing through the other one said first and second screen assemblies (8'', 36, 8''', 46).
 - 6. A basket as claimed in any one of claims 1 to 5 wherein said basket has a stack of three screen assemblies (8', 8'', 8''', 31, 36, 46).

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7. A basket as claimed in any one of claims 1 to 6 wherein at least said primary screen assembly (8', 31) has a different mesh size from at least one other said screen assembly (8', 8'', 36, 46).

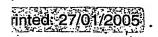
- 8. A basket as claimed in any one of claims 1 to 7 wherein said first and second screen assemblies (8', 8'', 36, 46) have the same mesh size.
- 9. A basket as claimed in any one of claims 1 to 8 wherein said flow distributor (15, 24) defines a plurality of flow pathways provided with flow control devices (20), for selective opening or, at least partial, closing of different passages (17, 18).

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- 10. A basket as claimed in claim 9 wherein at least one said flow control device (20) is selected from flap valves (20', 20''), sleeve valves, plug valves, and closure plates.
- 15 11. A basket as claimed in claim 9 or claim 10 wherein at least one said flow control device (20) is comprised by a weir (39), formed and arrange for sub-dividing a said feed into a said first feed stream passing over said weir and a said second feed stream not passing over said weir.

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- 12. A basket as claimed in claim 11 wherein said weir (39) comprises a variable height weir.
- 13. A basket as claimed in any one of claims 9 to 12 wherein 25 said flow distributor (15, 24) includes at least one wall (68) formed and arranged for defining a plurality of laterally adjacent flow pathways.



- 14. A basket as claimed in any one of claims 1 to 13 wherein the distributor (15) is mounted on the basket (4).
- 15. A basket as claimed in any one of claims 1 to 13 wherein the distributor (24) is coupled to the basket by flexible conduits (26).
- 16. A basket as claimed in claim 2 or any one of claims 3 to 15 when dependent on claim 2, wherein said basket (4) forms 10 part of a multi-basket assembly comprising a plurality of said baskets, mounted in said static housing (2), and wherein said housing (2) has a feed distribution device (15) formed and arranged for directing said liquid and solids mixture feed to any one or more of said plurality of baskets.

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- 17. A basket as claimed in claim 2 or any one of claims 3 to 15 when dependent on claim 2, wherein said basket (4) includes a lateral divider (68) defining independent feed processing modules (28, 29, 69, 70), and wherein said housing 0 has a feed distribution device (71-74) formed and arranged for directing said liquid and solids mixture feed to any one or more of said basket feed processing modules (28, 29, 69, 70).
- 25 18. A basket as claimed in any one of claims 1 to 17 wherein said flow directing trays (9,31,37) are formed and arranged so that substantially the whole of the filtrate from a screen assembly (8) directly above said flow directing tray (9,31,37) can be intercepted thereby, whereby said feed can be substantially fully divided into parallel first and

second feed streams to respective ones of first and second screen assemblies (8',8").

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